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I understand from Dorothy Fosdick that Mr. Schlesinger has indicated to Scoop Jackson that publication of the attached report which he did for Jackson's Subcommittee was a big factor in his attracting favorable White House attention before coming to Washington.

John M. Maury
Legislative Counsel

CRC, 7/3/2003

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90th Congress }
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COMMITTEE PRINT

PLANNING-PROGRAMMING-BUDGETING

USES AND ABUSES OF ANALYSIS

MEMORANDUM

PREPARED AT THE REQUEST OF THE
SUBCOMMITTEE ON NATIONAL SECURITY AND
INTERNATIONAL OPERATIONS

(Pursuant to S. Res. 212, 90th Cong.)

OF THE

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INTRODUCTORY NOTE

The subcommittee is pleased to be able to publish this memorandum by Dr. James R. Schlesinger in the record of its inquiry on planning-programming-budgeting in the national security area.

We asked Dr. Schlesinger to prepare a statement indicating major points relating to the role of analysis in the national policy process which he believes we should consider as we proceed with our inquiry, and he has provided this valuable addition to our testimony.

Dr. Schlesinger is Director of Strategic Studies at the RAND Corporation. Teacher of economics and analyst of weaponry and defense management in the nuclear age, he serves as consultant to the Bureau of the Budget and other government agencies on certain aspects of national security programs.

HENRY M. JACKSON,
*Chairman, Subcommittee on National Security
and International Operations.*

APRIL 22, 1968.

III

USES AND ABUSES OF ANALYSIS

By

James R. Schlesinger

The Subcommittee's invitation to assess the role that analysis may play in governmental decisionmaking is gratifying for a number of reasons. In its current stocktaking, the Subcommittee is accomplishing something of a turnabout: the analysis of systems analysis. This evaluation takes place at a critical time. Like other offspring in American life, analysis has been absorbed into an environment which has been at once both too permissive and too resentful. There is ample evidence that such a pattern is beneficial to neither the offspring nor the environment. Currently there is a risk that reaction against what may be termed the exuberance of certain claims and activities of analysis could result in the discarding of the substantial benefits that analysis does offer. I shall be attempting to bring out the instances of undue gullibility as well as undue skepticism, but in so doing I should perhaps make my own position clear. My attitude has long been one of two-and-a-half cheers for systems analysis. I recognize—and have emphasized—its limitations. I will make no excuses for offenses committed in its name. But despite the limitations and distortions, I remain unabashed, if qualified, defender of the value of analysis in policy formation.

In the pages that follow I shall deal with some salient issues regarding the role of analysis: its relation to decisions and decisionmakers, its functioning in a political environment where conflicting objectives exist, and its utility for improving the resource allocation process.

THE AUTHORITY OF ANALYSIS

Systems analysis has been variously defined. In the most ambitious formulation it has been described as "the application of scientific method, using that term in its broadest sense." Certain attributes of science—objectivity, openness, self-correctability, verifiability, etc.—are alleged to apply to systems analysis. Would that it were so, but realistically speaking such assertions must be rejected. Even for science—as those who are familiar with the history of scientific investigations will recognize—this represents a rather romanticized view. In science, however, competition takes the form of establishing hypotheses regarding the workings of the natural order. Evidence and experiments are reproducible, and institutions and personalities consequently play a smaller long-run role. In scientific investigations the search for truth is by and large unfettered. By contrast, in the search for preferred policies such encumbrances as social values and goals, constraints, institutional requirements (both broad and narrow) pertain. Truth becomes only one of a number of conflicting objectives and, sad to relate, oftentimes a secondary one.

An alternative definition described systems analysis as "quantified common sense." By some expositors this definition has been treated as the equivalent of the earlier one, but is really quite distinct. However high the regard in which common sense, quantitative or otherwise, is held in the American community, it never has been regarded as synonymous with scientific method. Nonetheless, the definition is far more apt. Common sense, for example, will accept that within a complicated bureaucratic structure distortions inevitably creep into the process of acquiring and organizing evidence. What one sees depends upon where one sits—an earthy way of describing what is more elegantly referred to as cognitive limits. It may be inferred that a systems analysis shop attached to the Office of the Secretary of Defense will be quite responsive to the perceptions and prejudices of the Secretary and the institutional requirements of his Office. This should be no more surprising than that the Operations Analysis shop at Omaha will be influenced by the doctrine, present activities, and aspirations of the Strategic Air Command.

In the early years of the introduction of the PPB into the Department of Defense, faith in the ease with which scientific objectivity could be attained tended to be high in OSD. For Service staffs, this was a rather painful period for rather invidious distinctions were drawn regarding *their* objectivity. In recent years an enormous change has taken place regarding the nature of the analytical dialogue. Undoubtedly this new attitude reflects experience and the growing awareness that past decisions and past commitments limit the openness and the freshness with which the OSD staff can address issues in controversy.

This new realism has been reflected in a number of ways. Especially in private appraisals analysis has been justified with increasing frequency and frankness as part of an adversary proceeding. But such an interpretation is symptomatic of a substantial change. Whatever the merits of an adversary procedure—and these are substantial where there exist clashes of interests and goals and where evidence is difficult to unearth—no one has ever suggested that adversaries seek to be wholly objective. One may hope that the result will be the elucidation of the best possible case for and the best possible case against. But, unfortunately, the emphasis tends to shift to a search for the winning argument as opposed to the correct conclusion. In view of the uneven distribution of debating skills, one cannot fail to have qualms about the probable outcomes. One senior official has observed, only half facetiously, that experience in debate is the most valuable training for analytical work.

Acceptance of the tug-of-war concept, as opposed to the objective-scholar concept, of analysis has coincided with recognition of an even greater limitation on analysis as a guide to policymaking. In recent years it has been recognized in public statements (as well as the textbooks) that analysis is not a scientific procedure for reaching decisions which avoid intuitive elements, but rather a mechanism for sharpening the intuitions of the decisionmaker. Once again this is right. No matter how large a contribution that analysis makes, the role of the subjective preferences of the decisionmaker remains imposing. Analysis is, in the end, a method of investigating rather than solving problems. The highest strategic objectives, the statement of preferences or utility, must in large part be imposed from outside.

Poor or haphazard analysis may contribute to poor decisions, but good analysis by itself cannot insure correct decisions. This implies two things. First, whatever the complex of decisions, legitimate differences of opinion will persist. Second, disagreement with the decisions should not automatically cast doubt on either the role of analysis in general or on the quality of specific analyses. These must be examined in and of themselves.

To be sure, the judgment of the decisionmakers regarding major objectives and what is or is not important is likely to feed back and influence the analysis. This is not always true, but there are strong pressures to make it come true. Studies are driven by the underlying assumptions, and these may be imposed directly or indirectly from above. Specific terms of reference may indicate which scenarios are acceptable, which unacceptable, and which contingencies should or should not be considered. It is perfectly appropriate, if not obligatory, for the analyst to point out deficiencies in study assumptions or terms of reference. Yet, many will lack the perception or the inclination, while others would regard such action as personally imprudent. In these cases the analysis will only play back to the decisionmaker a more sharply defined version of what was already implicit in his assumptions. The role of analysis then becomes not so much to *sharpen* the intuitions of the decisionmaker as to *confirm* them.

Under these circumstances analysis is not being used in its most fruitful form, that of raising questions. But analysis is a tool that can be used in a variety of ways. Much depends upon how the decisionmaker decides to employ it. Considerable fear has been expressed that analysis will usurp the decisionmaking role, that the decisionmaker will become passive, and let analysis (implicitly) make the decisions. This is possible; it is also improper. But whether the decisionmaker will control the tool rather than letting it run away with him strikes me as a less important question than whether he will employ it properly in another sense. Will the decisionmaker tolerate analysis—even when it is his own hobby horses which are under scrutiny?

How many hobby horses are there?

Are they off limits to the analysts?

Dr. Enthoven has quite properly objected to the canard that analysis is somehow responsible for what are regarded as the mishaps of the TFX decisions, pointing out that the new procedures were only tangentially involved. A more penetrating question, it seems to me, is: why did the analysts steer away from the issue?

A slightly different issue arises in the case of Vietnam. Numerous blunders are alleged to be chargeable to analytic errors. But analysis has been employed in the Vietnamese context in only the most cursory fashion. In this context neither the high-level civilian nor the military authorities have been eager to exploit the full potentials of analysis. Once again, rather than blaming analytic efforts for the failures, the appropriate question should be: why has analysis been so little employed?

An acquaintance, who has been deeply involved in analytic activities in one of the Departments, recently commented to me on his experiences. Analysis he felt had been relevant in only a small proportion of the decisions. Half the time a decision had been foreclosed by high-level political involvement: a call from the White House, interest expressed by key Congressmen or Committees. In an additional 30

percent of the cases, the careers of immediate supervisors were involved. Analysis could not influence the recommendations; it could serve only as an irritant. But, he argued, in something like 20 percent of the issues, analysis was unfettered and contributed to much improved overall results. This was only the experience of one individual. In other cases the proportions might be quite different. The point is that analysis should be judged on the basis of only the minority of cases in which its influence is in some sense instrumental. Analysis is a useful tool, but it is only a tool. It would be a mistake to turn over a new proverbial leaf—and generally find fault with tools rather than craftsmen.

PRACTITIONERS VERSUS INSTRUMENTS

Accepting that analysis only sharpens the intuitions of decision-makers, that its powers may be curtailed by unquestioned (or question-begging) assumptions or by imposed terms of reference, and that it is increasingly viewed as a contest between adversaries permits us to be more realistic about analysis in a number of ways. The inflated claims, periodically made in its behalf, may be rejected—along with the misplaced criticisms made in response. Questioning of decisions is turned into questioning of decisionmakers' judgments rather than the role of analysis. And analysis itself can be employed more effectively in clarifying the underpinnings of policies, thereby creating the potential for designing more effective ones. We should understand that analysis provides no formula for solving problems, no prescription for sensible policies. It cannot and should not be employed to "demonstrate" that one's own policies are so right and those of others, so wrong.

What analysis provides is an exercise in logical coherence, hopefully with knowledge of and respect for the underlying technical, economic, and organizational data. Coherence does not insure the "correctness" of policy. In fact, an incoherent policy will sometimes be closer to correct than a coherent one. But the incoherence itself scarcely makes a contribution. It is almost invariably a source of waste, and typically of policy muddles.

Analysis may make a contribution, but we should be very clear what it cannot do. It does not provide an instant cure for pigheadedness. In fact, it does not provide an instant cure for anything—not because of its theoretical deficiencies, but because it has to be employed by people and by organizations with divergent goals and views and with stringently limited information about actual conditions.

It is a mistake to identify analysis with the particular judgments, prejudices or arguable decisions of some of its major proponents. Especially is this so when analysis has been employed as a weapon of political conflict. The political process being what it is, it is hardly advisable to admit error in public; that would prove too costly. Human emotions being what they are, it is also unlikely that error will be admitted in private. This does not gainsay the value of analysis before policy commitments are made—or when they are being seriously reconsidered. What it does say is that we should avoid tying analysis to the personal proclivities of the particular individuals who were instrumental in introducing it into government. To do so may be flattering to the individuals. Some may even be inclined to treat their own attitudes and commitments as synonymous with analysis. It would be a serious error for others to accept this view.

Disciplined, orderly thought is the characterization given to analysis, but disciplined, orderly thought suggests certain traits: reflectiveness, self-criticism, and the willingness to reconsider past commitments without self-justification. However rarely or frequently encountered in the general human population, these are not traits characteristic of the action-oriented, incisive individuals who reach policymaking positions. Questioning and self-doubt lead to Hamlet-like decisionmakers.

Analysts themselves may be self-doubting, bemused by uncertainties, frighteningly candid, but different tactics have been required of the missionaries who have proselytized in behalf of analysis. I do not need to develop this point at any length. It should be plain, for example, that the actual decision to introduce analysis on a government-wide basis (as previously within the DOD) required an act of judgment and courage passing beyond the confines of analysis. Some analysts found the manner in which analytical procedures were instituted disquieting. This no doubt reflects a certain naivete on their part regarding political processes. But analysis was introduced rather suddenly. There was little advance preparation, little attempt to assess resource availability or calculate short-run costs. There was no "program definition phase." What occurred was that the political conditions were ripe,* and the opportunity was seized—for analysis.

I have perhaps belabored the distinction between analysis and judgment and the fact that the act of deciding occurs in the non-analytical phase. These matters need to be emphasized right now. It is important that analytical procedures in the DOD or elsewhere *not* be identified with particular sets of policies, decisions, or individuals. If analysis comes to be confused with the idiosyncracies of a few dominant personalities, there is some risk that it will disappear along with its original proponents. Its potential benefits for U.S. policy would then be lost for some time to come.

Admittedly there have been overstated claims, planted stories, and an impression generated among the *cognoscenti* of a new, scientific means for grinding out decisions. Admittedly the limitations appeared in the footnotes and not in the fanfare. But these are just the accoutrements of attention-getting. Analysis itself should scarcely be discarded on these grounds. Even if some decisionmakers or analysts have failed to display the mental elasticity that analysis in principle demands, this is only a reflection of the human condition. Why throw the baby out with the bathwater?

PAYOFFS

What is the baby? I seem to have devoted most of my attention to the reasons for refraining from that last half cheer for analysis, and virtually no attention to the reasons for the two and one-half cheers. In part this is due to the excellent set of papers and comments that the Subcommittee has published. Therein the potential benefits of program budgeting and analysis are fully presented. Lengthy reiterations of either the potential advantages or the accomplishments seem unnecessary. However, there are some points on which I should like to add a few words.

*This episode suggests why the politician in his role may find analysis both incomplete and frustrating. Analysis deals in a rather abstract way with resource usage and efficient allocations. It does not deal with the attitudinal issues of support-generation, coalition-gathering or with timing which are so important in the political context.

First, analysis has great value in turning debates over resource allocation toward the realities and away from simple statements of noble purpose. Analysis is not scientific method. Neither will it necessarily be objective in an organizational context. Yet, within the adversary relationship, analysis at least focuses the debate on what particular systems can accomplish and what numbers are required. The emphasis is on the real rather than the symbolic function of weapon systems. Disappointed as many in the Services have been with major policy decisions of the OSD, I believe most knowledgeable officers would agree that the new methods have been beneficial in this respect.

Second and closely related, analysis is oriented toward outputs rather than toward inputs. In this way expenditures can be tied to specific goals, and those expenditures which satisfy primarily the traditions or well-being of individual agencies are brought into question. There are difficulties with goal or output orientation, particularly since we so frequently lack complete understanding of the mechanism that ties inputs to outputs. But the orientation is correct. The government structure is subdivided into agencies that typically concentrate on inputs. Dams, warships, trees, post offices, bombers, nuclear power, supersonic transportation, and, I may add, research expenditures are often treated as ends in themselves—with little examination as to how these instruments serve public purposes. Conscious output orientation, with as much quantitative backup as possible, points in the right direction. It forces agencies to shift attention from their beloved instruments and to explain the goals they serve rather than the functions they perform—and this at a level more practical than the usual rhetoric of noble purpose.

Third, the attempt is made to design systems or policies with practical budgetary limits in mind. The time-honored gap between the planners and the budgeteers has been widely discussed, along with the difficulties it causes. There is little point in plans too costly to be implemented or systems too expensive to be bought in the requisite quantity—if some reduction in quality will provide a feasible and serviceable, if less ideal, posture. (Here we are discussing capabilities and postures which would be effective, if bought—keeping in mind that so many expensive proposals serve little purpose at all.)

Fourth, an attempt is made to take spillovers into account and to achieve better integration between the several Services and Commands. Once again, this is more easily said than done. For example, we are belatedly becoming aware of the spillovers and the integration problems between the strategic offensive force under Air Force management and the new Sentinel system under Army control. This indicates that the attempt to take spillovers into account has not been overwhelmingly successful, but the goal is a correct one. The nation would not wish to duplicate SAC's capabilities for SACEUR or the Polaris force for CINCSAC.

Fifth, the attempt is made to take into account the long-run cost implications of decisions. Perhaps, it is more appropriate to say . . . the attempt *should* be made. There has been a certain inconsistency on this account. The costs of some systems have been carefully investigated, before a choice is made. For other (preferred) systems this has not been the case. The Program Definition Phase was originally introduced to insure that technology was in hand and the long-run

costs considered before force structure decisions were made. Yet, curiously, in the programmed forces for the '70s our strategic forces are scheduled to become increasingly dependent on MIRVed vehicles, even though the technology is not yet in hand and we have only an inkling of the ultimate costs. The appropriate review of alternatives and hedges did not take place. But this represents, not a criticism of the objective, but a plea for more consistency in its pursuit. It hardly negates the desirability of the careful weighing of alternatives with the long-run cost implications taken into account.

These attributes and precepts of analysis seem unexceptionable.

They are.

An appropriate inference is that many of the complaints couched in terms of "too much analysis" or "the errors of analysis" should be altered into "better and more consistent analysis." In this connection, an editor and friend recently suggested a paper on the impact of systems analysis: "not the general appraisals, we've had enough of that; tell us whether systems analysis has ever really been employed in the Department of Defense." An exaggeration perhaps, but as the MIRVing case suggests, analytic techniques have not been consistently applied.

Bernard Shaw observed somewhere that the only trouble with Christianity was that it had never really been tried. An epigram is at best a half truth, designed as someone has commented to irritate anyone who believes the other half. In DOD systems analysis has at least been tried. But there is an element in Shaw's remark that needs to be taken into account. In assessing the success of analysis, both the incomplete implementation and the resistance should be kept in mind.

BUDGETS

Military posture is determined in large measure by the total volume of resources the society is willing to divert from non-defense to defense uses. Yet, understanding the determinants of this resource flow presents a most perplexing problem. No good mechanism or rationale exists for deciding what diversion is proper. Some analysts have shied away from the problem arguing that the main objective should be the efficient employment of whatever resources are provided. A limited feel for appropriate diversion may be obtained by asking such questions as how much more is needed for defense than is needed for other purposes. In principle, senior policymakers may find it no harder to decide on allocation between damage limiting and urban renewal than between damage limiting and assured destruction. They will certainly find it no easier. For a number of practical reasons, they may find it far harder actually to bring about such a resource shift.

The amorphousness of this decision area combined with the repudiation of what were regarded as the rigidities of the Eisenhower years led to some bold words in 1961: there would be no *arbitrary* budget limits; in addition, every proposal would be examined on its own merits. These guidelines have since been regularly reasserted—with perhaps somewhat falling conviction. Originally they might be attributed to sheer enthusiasm; now they can only be taken as either propaganda or self-deception.

However, no matter the source, they will not stand up to *analysis*.

At any time there exists a rough political limit on defense expenditures. For members of this Subcommittee—in fact for any practicing politician—such an assertion will seem like a truism. Something like a consensus develops regarding proper levels of defense expenditures—and in the absence of external shocks this sum will not be substantially augmented. Of course, the *arbitrary* limit is always the *other fellow's*. One's own limit is only proximate and is wholly reasonable. Yet, defense expenditures do tend to become stabilized for years within rather narrow limits. Inevitably, new pressure for funds leads to the sacrifice of programs previously desirable on their own merits. That is as simple as arithmetic.

The only time that budget limits are not pressing (and more or less arbitrary) is when, as during the early Kennedy years, a political decision has been made that much more can be spent on defense. After a brief period of exuberance, the old constraints reappear. The decision does not have to be announced by the President or the Budget Bureau. The Secretary of Defense may get a feel for what is feasible, or he may be trusted to bring in a reasonable figure. But within a rather narrow range he will face a limit, which he may not transcend without either creating a minor fiscal crisis or straining his own credit with the President of the United States.

Save in the rare periods of budgetary relaxation, this, rightly or wrongly, is the way the system works. There is no point in kidding oneself. One may erect a facade intended to demonstrate that there are no arbitrary budget limits and each proposal is examined on its own merits. The pretense can be partially successful, but only because the criteria for choice are so imprecise. Standards can be made increasingly stringent, yet no one can prove how large was the role of budgetary pressures.

Nonetheless, no one should be deceived. What happens is that various alternatives and hedges are discarded; programs become less pressing and are stretched out. The practices are well-known from the bad, old meat-axe days. Under budgetary pressure (arbitrary or not) it is truly remarkable how many options one discovers one can do without. Multiple options just become less multiple. Before uncertainties are resolved, commitments are made and hedge programs are terminated. In the well-advertised adversary relationship, the negotiator-analysts become much harder to persuade. If they are not directly instructed, *they know*.

These are not hypothetical possibilities. With the intensification of budgetary pressures stemming from the Vietnamese war, there has, for example, been a wholesale slaughter of programs in the strategic area. It is important not to be misled regarding the critical role of budgetary pressures—and thus come to believe that so many programs, previously regarded as meritworthy, have suddenly lost their merit. Otherwise, we might gradually come to believe that we are doing far better than is actually the case. One should remain aware that the decimation of a program has long-run postural implications. That is, after all, the message that PPB attempts to convey.

These are elementary propositions. I do not dwell on certain theoretical problems and inconsistencies bearing on the relationship of overall defense spending to the optimality of programs. Suffice it to say that the *quality* of what one buys depends upon how much one wants to spend. This connection between level of demand and cost/

effectiveness creates a dilemma in that *neither* the character of the programs nor the size of the budget can be determined initially. But that is a theoretical nicety, the direct consequences of which may not be of major importance.

The vital point is the way in which budgetary limits may control force posture and therefore strategy. Shifting sands seems the best way to characterize the strategic rationales of recent years. In 1961 the suicidal implications of massive retaliation were underscored: the United States would be faced with a choice between humiliation or holocaust. Interest then developed in damage-limiting and coercion. But there has been little willingness to invest money in either. Since 1965 the merits of Assured Destruction have been emphasized—with little attention paid to the suicidal implications found so distressing in prior years. The principal rationale for the current emphasis on Assured Destruction reflects certain recently-developed notions of arms control. It clearly falls within the province of the decisionmakers to adopt a strategy of measured response to any Soviet buildup with the long-term objective of preserving U.S. Assured Destruction capabilities. One should note, however, that to accept this particular guide to action implies that the buildup of the Minuteman force in 1961–62 was a mistake. These newer arms control criteria may be the preferred ones, but they rest on the judgments and intuitions of the decisionmakers. They certainly do not emerge by themselves from analysis.

May one infer that the oscillations in strategy have something to do with budget limits, or in this case something more specific: a preconception regarding how much this nation should spend on the strategic forces? I find the conclusion irresistible. The evidence antedates the current phase-down in the face of the Soviet buildup. Once again, these lie within the decisionmaker's prerogatives, but particular beliefs regarding budget limits or the "adequacy" of specific strategies should not be attributed to, much less blamed on, analysis.

A USEFUL IF OVERSOLD TOOL

Whatever resources are made available to defense (or any other mission), choices will have to be made.

Allocative decisions inevitably are painful; many claimants will be sorely disappointed.

Few will find fault with their own proposals, almost all with the machinery for selection.

Any procedures for allocation will be criticized—even in a hypothetical case in which the conceptual basis is unarguable and no errors are made. Analysis provides the backup for a selective process. What does it contribute? How does it compare with real-world alternatives—not with mythical alternatives in which all claimants get their requests and no one is disappointed?

It has been emphasized that analysis cannot determine the appropriate strategy. It can shed light on costs and tradeoffs. But the choice to press arms control or arms competition or to rely on tactical nuclears or nuclear firebreaks must be determined by the decisionmaker sustained primarily by hope, conviction, and prayer. Even if a decision could be demonstrated as correct at a given moment in time, there is the certainty that objectives will change over time. For these higher level problems analysis is an aid, but a limited aid. The toughest

problems, dominated as they are by uncertainties and by differences in goals, do not yield to analysis.

Happily many problems are more mundane and more tractable. Where analysis has proved its highest value is in uncovering cases of gross waste: points at which substantial expenditures may contribute little to any stated objective. It might be thought that a problem of diminishing returns exists for analysis in that the cases of gross misuse of resources are likely to be uncovered at an early stage. Thus, as the opportunity for major savings through elimination of irrational forms of waste theoretically recedes, analysis would be forced into the more ambiguous areas in which strategic choices become intimately involved. In some cases, where information is readily available and objectives and conditions relatively unchanging, this could prove to be true. The very success of analysis would then undermine near-term expectations of additional returns. However, in defense this turns out to be irrelevant, since the problems are so volatile and information so difficult to unearth.

To say that analysis works best in cases of gross waste should not be taken to imply that analysis accomplishes little. The simple cases involving so-called dominant solutions may involve billions of dollars. The volume of government resources that may be lavished on the care and feeding of white elephants is simply staggering.

Here we have "quantified common sense" in its most direct form. In bureaucracies, units at all levels are concerned with organizational health. Rather than making the hard choices, the tendency is strong to maintain morale by paying off all parties. Analysis provides a means for coping with this problem. The big issues may not be directly involved, though they are likely to be dragged in by the proponents of particular programs.

Should the assessment of analysis be much influenced by the annoyance felt by those whose proposals have failed the tests? Certainly not in the general case. No more than should the decisionmakers be permitted to hide their judgments behind the camouflage of analysis, should the patrons of doubtful proposals be encouraged to argue that acceptance would and should have come—if *only* analysis had not been employed. Budgets are limited and hard choices must be made. If nobody were annoyed analysis would not be doing its job—of questioning both routinized practices and blue-sky propositions. Disappointment is unavoidable. The question is not the existence of annoyance, but to strive to annoy in the right way and for the right reasons.

In this light it may be desirable to examine the issue of the generalist versus the specialist which has been touched upon in the Hearings. In the nature of things specialists become committed to particulars: a piece of hardware, a technological criterion, a disciplinary blind spot. It is a case of suboptimization run wild. Proponents of specific capabilities or gadgets tend to become monomaniacs. In a sense that is the way they should be: totally dedicated to their tasks. But one does not turn to them for detached judgments. There is no substitute for the *informed* generalist. There is a recognizable risk that the superficiality of the generalist may match the monomania of the specialist. However, that need not be the case. Although the generalist's knowledge cannot match that of the specialist in detail, analysis can

once again play a useful role, by permitting the organization for the generalist of more specialized information than he alone could master.

How does this relate to the limits of the analyst's role? Two distinctions should be kept in mind: that between the technical specialist and the analytical generalist and that between the analyst and the decisionmaker. The analyst's tools are not circumscribed by discipline or even by subject matter. But general tools are not immediately convertible into broad policies. Many analysts are, in some sense, specialists in the use of general tools. Being a good analytical generalist does not necessarily imply possession of such additional qualities as breadth, judgment, and political attunement. These latter qualities are what many have in mind when they speak of the generalist as policymaker.

CONCLUSION

In closing I should like to underscore three points.

First, the position of the decisionmaker employing analysis is somewhat ambiguous. For tactical purposes this ambiguity may be deliberately augmented. Intermittently he may choose to stress *analysis* or *judgment*, and to shift hats according to the tactical requirements of the moment. His policy judgments may be obscured or defended by cryptic references to detailed analyses which allegedly force the policy conclusions. On the other hand, if any limitations or inadequacies in the analyses should come to light, these can be waved away with the reminder that all issues are ultimately matters for the decisionmaker's judgment.

Moreover, the pattern is in reality far more complicated than the standard exposition in which the analyst produces an *objective* study, and the decisionmaker's judgment enters at a later stage erected on the foundation of these objective results. That makes the analytical and judgmental stages seem clean-cut. Few studies are that pure. The decisionmaker's judgments quite typically are dumped in at an early stage in the form of guidance, assumptions, and terms of reference. The more political a study, the less likely is it to be pure. In fact, the process can be (and has been) far more corrupted, when questionable (phony) numbers are introduced. Since judgment and analysis are thoroughly intertwined in all but a few studies, the attempt of decisionmakers to shift roles by referring to fundamental analyses should be treated with some skepticism. The decisionmaker should not be permitted to escape the full burden of responsibility by the invocation of analysis.

The temptation for those who have introduced analytical techniques into the government to treat their own positions or careers as identical with analysis is understandable. No outsider should yield to the same temptation. The roles and even the temperaments of decisionmaker and analyst are quite distinct. The confusion tends to disguise the heavy personal burden borne by the decisionmaker. More important, if analysis is treated as synonymous with particular decisions or personalities, there is a risk that it will be throttled or abandoned after their departure. From the standpoint of public policy this would be a major loss.

Second, we should avoid the erroneous belief that the performance or potential power of analysis will be uniform in all contexts. If a town is considering building a bridge, a number of difficult analytical

problems must be addressed: does demand warrant construction, where should the bridge be built, what should be its capacity, and so on. But once these questions are resolved the engineer falls back on a solid technical base. By contrast, for such goals as deterrence, assured destruction, controlled nuclear warfare, damage limiting, to say nothing of welfare benefits, we fall back, not on a firm technical base, but on what may be scientific mush. The distinction is not always appreciated. The difficulty is sometimes dealt with by referring euphemistically to *the model problem*. But our ability to formulate models depends upon our knowledge of the mechanics of the real world. For many problems our knowledge is meager, and the proffered models are misleading or downright erroneous. The lack of good models in many problem areas simultaneously limits the power of analysis, while increasing the burden placed on judgment. In treating analysis as a uniformly efficient problem-solving technique, the variability of analysis, which reflects the variability of the knowledge base, is ignored.

Though analysis is a powerful tool, specific analyses vary greatly in quality. Some are little more than trash. But we need to discriminate, rather than to reject analysis *in toto*. At the present time there is some risk that we will do the latter. In an address some years ago Secretary Enthoven observed: "My general impression is that the art of systems analysis is in about the same stage now as medicine during the latter half of the 19th century; that is, it has just reached the point at which it can do more good than harm." That was a frank and realistic, if somewhat pessimistic, assessment of the state of the art. Scientifically speaking, there are numerous blind spots in medicine. Yet, most of us ultimately are inclined to accept the doctor's diagnosis, if not his advice. Quite plainly at the present time Congress and the public are having second thoughts regarding how much trust to put in systems analysis. No doubt it is necessary to develop a greater ability to discriminate. Nonetheless, I suggest that policy will benefit substantially from the analysts' diagnoses.

Third, there is little doubt that analysis has been oversold. That strikes me as a rather standard result in matters political. But the reaction against the overselling could be more costly than the overselling itself. Analysis is a powerful instrument: with it our batting average has been far higher than without it. Analysis is also an adaptable instrument. The McNamara regime has in many respects been a highly personalized one. Its performance should not be taken as defining the limits of this flexible tool. Admittedly, analyses vary substantially in quality. Each should be taken with a large grain of salt. On the other hand, if one does not demand too much of it, analysis will prove to be a most serviceable instrument.

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